

WHAT IS CLAIMED:

1. A process for treating a crude oil fraction to reduce levels therein of both sulfur-bearing compounds and nitrogen-bearing compounds, said process comprising the steps:

(a) mixing a hydroperoxide with said crude oil fraction to form a first admixture and heating said admixture, said admixture being sufficiently heated to oxidize the majority of said sulfur-bearing compounds and a majority of said nitrogen-bearing compounds present in said crude oil fraction; and

(b) separating said oxidized sulfur-bearing compounds produced in step a) and separating said oxidized nitrogen-bearing compounds produced in step (a) from said crude oil fraction.

2. The process of Claim 1 wherein in step (b), said oxidized sulfur-bearing compounds and said oxidized nitrogen-bearing compounds are separated via hydrodesulfurization.

3. The process of Claim 1 wherein in step (b), said oxidized sulfur-bearing compounds are separated via centrifugation.

4. The method of Claim 1 wherein step (a) further comprises exposing said admixture to sonic energy.

5. The method of Claim 3 wherein said separation of said oxidized sulfur compounds utilizing centrifugation is operative to produce at least one first layer having a first sulfur content and a first density and at least one second layer having a second sulfur content and a second density, said first sulfur concentration being less than said second sulfur concentration and said first density being less than said second density.

6. The process of Claim 1 wherein said crude oil fraction is a fraction boiling within the diesel range.

7. The process of Claim 4 wherein said crude oil fraction is a member selected from the group consisting of fluid catalytic cracking (FCC) cycle oil fractions, coker distillate fractions, straight run diesel fractions, and blends thereof.

8. The process of Claim 1 wherein said crude oil fraction is a fraction boiling within the gas oil range.

9. The process of Claim 6 wherein said crude oil fraction is a member selected from the group consisting of FCC cycle oil, FCC slurry oil, light gas oil, heavy gas oil, and coker gas oil.

10. The process of Claim 1 wherein said crude oil fraction is a member selected from the group consisting of gasoline, jet fuel, straight-run diesel, blends of straight-run diesel and FCC light cycle oil, and petroleum residuum-based fuel oils.

11. The process of Claim 4 wherein in step (a) said crude oil fraction is exposed to said sonic energy from about 1 second to about 1 minute.

12. The process of Claim 1 further comprising contacting said emulsion with a transition metal catalyst during step (a).

13. The process of Claim 12 wherein said transition metal catalyst is a member selected from the group consisting of metals having atomic numbers of 21 through 29, 39 through 47, 57 through 79.

14. The process of Claim 12 wherein said transition metal catalyst is a member selected from the group consisting of nickel, silver, tungsten, cobalt, molybdenum, and combinations thereof.

15. The process of Claim 12 wherein said transition metal catalyst is a member selected from the group consisting of nickel, silver, tungsten, and combinations thereof.

16. The process of Claim 1 wherein in step (a), said admixture is heated to a temperature no greater than 500°C.

17. The process of Claim 1 wherein in step (a), said admixture is heated to a temperature no greater than 200°C.

18. The process of Claim 1 wherein in step (a), said admixture is heated to a temperature no greater than 125°C.

19. The process of Claim 1 wherein step (a) is performed at a pressure of less than 400 psia.

20. The process of Claim 1 wherein step (a) is performed at a pressure of less than 50 psia.

21. The process of Claim 1 wherein step (a) is performed at a pressure within the range of from about atmospheric pressure to about 50 psia.